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ABSTRACT

Nonsense forms with nonsense labels were utilized in a match to sample task to observe whether children's word extensions are based on static form characteristics or on functional action characteristics. The stimuli consisted of: (1) a single model object which performed an action: (2) a selection array consisting of one object similar in form to the model, but with no demonstrated action; and (3) another object of a very different form than the model's, but which performed a similar action to that of the model's. Subjects were 31 normal preschool children ranging in age from 2;3 to 5;9. When form and action were in competition for the basis of the children's selection responses, action was the more frequently noted basis. More data are being collected from older children to observe when a shift in basis of extension occurs. Longitudinal data are also being collected on four children, two of whom are presently action based, and two of whom are presently form based in their word extensions. Implications for contrastive investigations with language impaired children are noted. (Author/SW)

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COMPARISON OF STATIC FORM AND DYNAMIC ACTION AS THE BASIS OF CHILDREN'S EARLY WORD EXTENSIONS

Michael W. Casby

Abstract: Nonsense forms with nonsense labels were utilized in a match to sample task to observe whether children's word extensions are based on static form characteristics or on functional action characteristics. The stimuli consisted of (a) a single model object which performed an action, and (b) a selection array consisting of one object similar in form to the model, but with no demonstrated action, and another object of a very different form than the model's but which performed a similar action to that of the model's. When form and action were in competition for the basis of the children's selection response, action was the more frequently noted basis.

In 1973 Clark proposed a hypothesis of children's early semantic development based in part on the notion that there is a set of universal semantic features. The semantic feature hypothesis (SFH) as it has come to be known proposes that the meaning of words is made up of features or components of meaning, and that children learn word meanings gradually by adding more and more features until the acquired meaning matches the adult meaning.

The SFH is based for the most part on data gained from an extensive review of previous diary studies of child language development (Clark, 1973). A phenomenon which Clark observed was that of "overextension" during the child's early semantic development. She defined overextension as the child's over-use of a particular word. The child applies, or misapplies one lexical item to many different referents. However, it is not a random overextension of the word. Each of the referents has some similarity. Clark (1973; 1974) observed that the basis of these overextensions are shared static perceptual characteristics among the refents (i.e. shape, size, texture, sound, and to a lesser extent color).

From these ancedotal accounts Clark abstracted some of the misapplications of children's early words. Her data demonstrated that the majority of the features first used by children in overextensions are derived from their (children's) perception of the static perceptual characteristics of the objects.

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An often used example of a child's overextension based upon static perceptual characteristics is found in Bowerman (1976). One of her subjects used the word moon to refer to a real moon, grapefruit halves, the letter D, hangnails she was pulling off, and cresent-shaped pieces of paper. In this example the child is applying the percept of cresent-shapeness. Clark (1973; 1974) has stated that shape and size seem to be the most often observed perceptual bases of overextension.

Nelson (1974) hypothesized that shared dynamic function is the child's basis for classification and for early word meanings. Things are considered part of a given category because they are similar in the way they can be acted upon, or act themselves, or move, and not because they look similar. Nelson hypothesized that the purely static perceptual characteristics of an object may serve a predictive function as to which semantic category an object belongs, but it is not until the child has observed the function of the ojbect that he categorizes it. The functional and not the perceptual characteristics are criterial to its classification.

Both Clark and Nelson are in agreement that, once acquired, a word is usually generalized to other similar things. Both static perceptual and dynamic functional properties of the objects are available to the children. The debate concerns which of these properties forms the basis of children's early word extensions.

Bowerman's (1978) summary of available evidence indicates that perceptual similarity plays the more important role in children's early semantic development. She reports that over-extensions based on perception of shape and size occur earlier in the word stage than do functionally based overextensions.

Gentner (1978) investigaged the bases of children's semantic categories. She used a jiggy (form base) which was a box with a face and lever on its side, and a zimbo (function base) which was a gum ball machine. A third, hybrid object was a box with a face and lever attached to it. However this hybrid gave gum as did the original zimbo when its lever was moved. The children were to respond by labeling this hybrid as jiggy or zimbo.

Gentner reported an age trend in which the children's naming response of the hybrid was initially based on shared form while the middle age group responded on the basis of shared function, and the oldest of her subjects returned to a form bias in their naming of the hybrid. Gentner did not counterbalance the presentation order of the jiggy and the zimbo to the children. They were always presented with the jiggy followed by the zimbo, again presented with the jiggy, and then finally the hybrid object. This unequal presentation of the jiggy, and a possible order effect could account for Gentner's results. The younger children's tendency to respond on the basis of shared form (i.e. calling the hybrid a jiggy) may be the result of always having more exposure to the

jiggy, and always having it presented last. Gentner's procedures also only allowed for one trial, and temporal reliability of the child's response was not assessed. Another problem with the Gentner study was that she used familiar objects (e.g. gumball machine) that the children already had a name for. This situation may have presented the child with an interference situation. That is, the child's prior knowledge of the name of the gumball machine may have prevented him from labeling the hybrid such. The child knew what a gumball machine was and in this case the experimenter was merely calling it a zimbo.

The following pilot study attempted to determine the basis of children's semantic categories in a controlled experimental task. Nonsense forms with nonsense labels were utilized in a match to sample task to observe whether children make semantic categorical judgments based on static form characteristics or on functional action characteristics. It should be emphasized that the procedure and data reported here are of a preliminary nature and that an extension of this study is currently underway.

Method

Stimuli

The stimulus items consisted of five sets of nonsense objects, (i.e. small wind up toys with paper mache' forms molded around them). Each set consisted of (a) a single model object (which performed an action) and was labeled with a nonsense name; (b) two other nonsense objects from which the subject selected one as his response. The set of selection objects consisted of one object similar in form to the model object, but with no demonstrated action, and another object of a very different form than the model's, but which performed a similar action to that of the model object.

Subjects

Subjects were normal pre-school children. There were a total of 31 children ranging in age from 2;3 to 5;9 as of this writing. Children were selected at random from a population of preschool children. The children were individually tested for their ability at matching according to form or action when that was the only possible basis of a matching response. All of the children described herein were able to match on both form and action when either was criterial.

Procedures

The children were seen individually. The child and the investigator were seated in a quiet non-distractable area of the pre-school. Prior to beginning the experimental condition, two pre-test conditions were carried out. First, the children were

required to carry out a simple match to sample task in which they were shown one small toy as the model. They were then presented with a selection array of two toys one of which was identical to the model. The children were presented with a series of similar object sets until they reliably selected the appropriate matching toy. This was to insure that the children were capable of responding to a match to sample procedure. The second pre-test was to assess each child's ability at matching according to either form or action when each were the only possible correct basis of a matching response. The pre-test for ability at matching according to form was as follows. The model object was a small square block. The selection array objects consisted of a small square block, and a cone shaped figure that moved. An appropriate response would be matching the two square blocks. The action of the second selection array object was included to serve as an additional foil for those children who might be prone to select an object that moved simply because of the saliency of movement. But even presented with this diversion the children reported on herein were able to match according to form.

The action pre-test stimuli also consisted of a model object. However the model object for this pre-test performed an action (e.g. a moving extremity). A correct response of selecting the object with the moving extremity indicated the ability to match on the basis of shared action.

One of the pre-test trials was selected at random for each child to be inserted between the second and third experimental trials. This was done for two reasons. First, to assess temporal reliability of the child's pre-test response, and second, to serve as an attention check. That is, if the child was attending to the task he should be able to match correctly at this point in the experimental sequence as he had demonstrated earlier during the pre-test trial.

The investigator began the experimental trials by first presenting the model object of the first stimulus set. The model object was presented as it performed its action. The investigator simultaneously directed the child's attention towards the model object and labeled it with its nonsense name (i.e. "Look, this is a bik."). Leaving the model object in sight the investigator next presented the selection stimulus array objects to the child (i.e. one similar in form and one similar in action to that of the model). All of the selection array objects were hidden from the child behind a Modified Wisconsin General Test Apparatus (MWGTA). The MWGTA was lifted by a second investigator at the point when the child was to make the selection response. The child was prompted to make a selection choice by the investigator pointing to the model object and saying, "Here is my bik." Then pointing towards the selection array objects the investigator said to the child "Take your bik." The subjects' responses then, were their selection of an object from the selection array stimulus. It was based either on shared form or on shared action. The presentation of the five sets of

stimuli was randomly ordered across the subjects, and further the location of the objects in the selection stimulus array was made at random.

Results and Discussion

When form and action were in competition for the basis of the children's selection responses action was the more frequently noted basis. A binomial test (Siegel, 1956) for assessing significance between the basis of childrens selection responses was used. As can be seen in Table I the number of action based responses was significantly higher for both groups of children. The observation that the majority of the children's responses were based on shared action with the model was thus supported statistically.

AGE	N	ACTION	FORM	P
2 - 3;11	17	.62	.38	.05
4 - 5;11	14	.63	.37	.01

Table I. Proportion of responses

Both groups of children in the present investigation demonstrated a preference or strategy based upon the application of shared action. This observation is quite different from the one presented by Gentner (1978) for a group of children of similar age. Her youngest group of children (CA 2 - 5) demonstrated a higher proportion of form-based responses, but as mentioned earlier, this may have been an artifact of not having counterbalanced the experimental conditions. The proportion of form responses is higher for Gentner's youngest group of children. However she does not report any significance level for this observation. If one looks at Gruendel's (1977) work in which she made the observation that children do apply words to novel referents based upon action alone, and also on the basis of form alone, the conflicting results between the present study and that of Gentner are not alarming. It may be that certain children tend to be action bound while others are formed bound. Or a further explanation may be that when one takes into consideration individual differences in language learning, then one might not expect that all children extend a word to novel referents for the same reason.

The question of the primacy of form over function in children's extensions of word application is of most concern with children younger than those reported on here or those reported on by Gentner. Therefore it is difficult to address the results of this investigation (i.e. the observed primacy of action) to that particular narrow debate. It is quite probable that the children discussed here have passed the

stage of language development where shared form had primacy, and they are now in a stage where action has primacy. Additional data from controlled investigations with younger children, although extremely difficult to acquire, is needed to note any probable shift in the basis of word extensions. From the present data there does not appear to be a shift in preference or strategies at six month, 12 month, or 2 year intervals, but rather the stages are much broader. For example Gentner's age ranges were comprised of a three year range, while the present population consisted of a four year range in which children were observed to be applying a common basis of word extension. At the present time more data are being collected from populations of older children to observe when a shift in basis of extension does occur. To further investigate this probable shift in the children's preferences, longitudinal data are being collected on four children, two of whom are presently action based, and two of whom are presently form based in their word extensions.

The point to point temporal reliability of the children's responses was very high (.93). That is, the children who were re-administered the experimental task displayed the same response patterns as they had during the initial experimental sessions.

One of the more pervasive observations of the present study was the consistency of response patterns observed in the children. For example, out of 31 children, 28 had a consistent response pattern in that at least four out of the five trial choices were made on the same basis (binomial; $p < .001$). This observation has interesting implications for contrastive investigations with language impaired children. It may be that language impaired children would demonstrate a more inconsistent response pattern. The basis of a preference or strategy may not be important. What may be of more importance is that the child is utilizing a consistent strategy regardless of its basis. Rice (1978) points out that there has been little research in addressing the semantics of the language impaired. The notions of consistent versus inconsistent response preferences in the language impaired is an interesting area for future research.

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